

Section 508 & Software Development

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What is Section 508



- /// Federal agencies' electronic and information technology is to be accessible to people with disabilities
 - ☞ Employees
 - ☞ Members of the public

- /// Workforce Investment Act of 1998 contained two significant additions
 - ☞ Enforcement
 - ☞ Technical standards

- /// Individuals with disabilities can file a complaint concerning the inaccessibility of an agency's electronic or information technology
 - /// Alternatively, individuals may file a civil action against an agency
 - /// Remedy is agency compliance, i.e., not a monetary penalty or reward
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/// Independent Federal Agency

- ☞ Created in 1973
- ☞ Primary mission is accessibility for people with disabilities

/// Directed to publish Federal E&IT technical standards

- ☞ Draft issued March 20, 2000
 - ☞ Final issued December 21, 2000
 - ☞ Standards effective June 25, 2001
 - ☞ Exempts only national security systems
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Six Subsections



- /// ***Software applications and operating systems***
- /// Web-based intranet and internet information and applications
- /// Telecommunications products
- /// Video and multimedia products
- /// Self contained, closed products
- /// Desktop and portable computers

Contractor Obligations



- /// Contractors are not required to procure accessible hardware and software to carry out government related activities, unless contract calls for delivery
- /// If the contract calls for delivery, the hardware and software must be accessible, more specifically must comply with Section 508

Agency Obligations



- /// Federal agencies must comply with the standards when it develops, procures, maintains or uses electronic and information technology
- /// Federal agencies must comply with these standards unless to do so would be an ***undue burden*** and undue burden must be documented

Undue Burden



- /// Analogous to undue hardship that was defined by Congress as “an action requiring significant difficulty or expense”
- /// Agency resources available to a program or component are considered in determining whether an action is an undue burden
 - ☞ Case-by-case basis

- /// Section 508 requires agencies to procure (develop) accessible electronic and information technology regardless of whether they have employees with disabilities
 - ☞ Eliminates any need for later retrofitting
 - ☞ Retrofitting is changing /adding requirements and may be a significant difficulty or expense

- /// Agencies prohibited from procuring (developing) inaccessible E&IT then claiming hardship

Equivalent Facilitation



- /// Designs or technologies that result in substantially equivalent or greater access to and use of a product for people with disabilities
- /// Not a waver or a variance
- /// Future technologies or existing technologies used in new ways may provide the same functional outcome -- e.g., voice recognition/activation replaces a keyboard

- /// NASA among Section 508 leaders in procurement and web sites
 - ☞ Training and guidance exist and more is in the works
 - ☞ Web compliance V&V is coming this summer (at GSFC)
- /// NASA's draft software policy document, NPR 7150.x, (new numbering) requires Section 508 compliance
 - ☞ Software Engineering Requirement # 14 [SWE014] is

The project shall ensure that software is accessible to individuals with disabilities as required by Section 508 of the Rehabilitation Act (29 U.S.C. 749d), as amended. Specific requirements for accessibility may be found at 36 CFR Part 1194, available at

<http://www.access-board.gov/sec508/508standards.htm>
 - ☞ Training and guidance do not yet exist
 - ☞ Compliance V&V is likewise non-existent

What is Software Accessibility?



Anyone should be able to use any electronic and information technology and have the full and complete ability to interact with the software whether or not the person has a disability

Accessibility applies not only to E&IT interfaces, but also to **documentation, training, and support.**

- /// The term accessible was defined in the proposed Section 508 rule (March 2000) as compliance with the rule's technical standards
- /// Comments received objected to using this definition of accessibility as a measure of compliance (circular)
- /// Final Section 508 rule does not define or use the term “accessible”

- /// Paragraph 1194.21 (a) through (l) addresses software applications and operating systems
- /// Standards ensure access for people with disabilities who rely on assistive products
 - ☞ Not universal accessibility (accessibility for all)
 - ☞ Not necessarily usability either (design issue/topic)

Keyboard Access (a)



- /// When software is designed to run on a system that has a keyboard, product functions shall be executable from a keyboard where the function itself or the result of performing a function can be discerned textually
 - ☞ Provide a means of invoking commands from a keyboard
 - ☞ Allow user to tab rather than require a mouse
 - ☞ Does NOT require adding a keyboard to a product that is not intended to have one
 - ☞ Applies to products that are intended to be run on a system with a keyboard



- /// Bring up the Windows Internet Explorer browser
- /// Turn off images, sound, multimedia, Java, JavaScript, ActiveX, etc.
 - ☞ Tools > Internet Options > Advanced (tab) > Multimedia and uncheck all boxes
 - ☞ Optional: Tool > Security > Custom Level and disable
 - Run ActiveX controls and plug-ins
 - Active scripting
- /// Navigate a favorite web site or two or three ☐

USE KEYBOARD ONLY i.e., forget the mouse

Hints:

- the “tab” key is your friend

- alt & left arrow replaces the back button

- alt & F4 closes a window

(Don’t forget to restore check boxes and enable optional controls if disabled)

Accessibility Features (b)



- /// Applications shall not disrupt or disable activated features of other products that are identified as accessibility features, where features are developed and documented according to industry standards
 - ☞ Reference to standardized access features was added to proposed rule after receiving several comments that developers can't be aware of all features in all products

Features (continued)



- /// Applications also shall not disrupt or disable activated features of any operating system that are identified as accessibility features where the application programming interface for those accessibility features has been documented by the manufacturer of the operating system and is available to the product developer
 - ☞ Example: Microsoft Active Accessibility (MSAA)
 - ☞ Application programming elements that provide reliable methods for exposing information about user interface elements such as toolbars, menus, text, graphics, columns, and cells

- /// Software must not affect the usability of other applications or the operating system for people with disabilities

- /// Examples of accessibility features
 - ☞ Modifying the color scheme
 - ☞ Showing a visual prompt for an audio tone
 - ☞ Providing sticky keys (sequential combinations)
 - Control-C
 - <Control><C>

Current Focus (c)



- /// A well-defined on-screen indication of the current focus shall be provided that moves among interactive interface elements as the input focus changes
- /// The focus shall be programmatically exposed so that assistive technology can track focus and focus changes
 - ☞ Focus is where an action will take place
 - ☞ Tab key is used to move focus

Interface Elements (d)



- /// Sufficient information about a user interface element including the identity, operation and state of the element shall be available to assistive technology
- /// When an image represents a program element, the information conveyed by the image must also be available in text

- /// Information about program's controls must be made available to assistive technology, such as screen reading software

- /// Examples of controls:
 - ☞ Checkboxes
 - ☞ Menus
 - ☞ Toolbars

Images (e)



- /// When bitmap images are used to identify controls, status indicators, or other programmatic elements, the meaning assigned to those images shall be consistent throughout an application's performance
 - ☞ Many screen readers allow the user to associate text names with images (icons)
 - ☞ Changing an image's meaning renders the text name invalid and is confusing

Applies only to controls, status indicators, or other programmatic elements

- /// Textual information shall be provided through operating system functions for displaying text
- /// The minimum text information that shall be made available is
 - ☞ Content
 - ☞ Attributes
 - ☞ Input (caret) location

Text (continued)



- /// Software for assistive technology is unlikely to be able to interpret unique methods for writing text or displaying graphics on the screen
- /// Unique methods are not forbidden
- /// Text must however be consistently written using standard operating system protocols so other software programs can process the output.

- /// Applications shall not override user selected contrast and color selections and other individual display attributes
 - ☞ Many operating systems provide system-wide settings as an accessibility feature
 - ☞ Personalized settings may include
 - Color contrast
 - Keyboard repeat rate
 - Keyboard sensitivity settings

- /// When animation is displayed, the information shall be displayable in at least one non-animated presentation mode at the option of the user
 - ☞ Animation can pose serious problems for assistive technology such as screen readers
 - ☞ Animated text (scrolling) can be a problem for people with any of several visual and cognitive disabilities

- /// Color coding shall not be used as the only means of conveying information, indicating an action, prompting a response, or distinguishing a visual element

- /// Example: green start button
 - ☞ A statement may read "press the green button labeled start to begin"
 - ☞ The word "start" shall be associated with this green button on the page
 - Visually
 - As text

- /// When a product permits a user to adjust color and contrast settings, a variety of color selections capable of producing a range of contrast levels shall be provided
 - ☞ An overly bright background may cause a visual “white-out” in some users
 - ☞ User must be able to select a softer background and appropriate foreground colors
- /// Color Contrast Verification Tool (W3C algorithm)
http://h10014.www1.hp.com/accessibility/color_tool.html

Screen Flicker (k)



/// Software shall not use flashing or blinking text, objects, or other elements having a flash or blink frequency greater than 2 Hz and lower than 55 Hz

- ☞ Rate can induce a seizure in people with photosensitive epilepsy

- ☞ Consistent with revised ADA Accessibility Guidelines

- ☞ Demonstration

http://ncam.wgbh.org/richmedia/media/flicker_demo_start.html

Electronic Forms (I)



- /// When electronic forms are used, the form shall allow people using assistive technology to access the information, field elements, and functionality required for completion and submission of the form, including all directions and cues
 - ☞ The 1998 Government Paperwork Elimination Act requires that Federal agencies make electronic versions of their forms available on-line when practicable
- /// At present, interactions between form controls and screen readers can be unpredictable
 - ☞ Developers place control labels in various locations in various distances from the controls themselves
 - ☞ Screen reader responses are often less than accurate

Form Response Time



- /// When a timed response is required, the user shall be alerted and given sufficient time to indicate more time is required or be allowed to turn the timing off
- /// Disability can have a direct impact on user's speed
 - ☞ Very frustrating when form just disappears

- /// “Introduction to the Screen Reader” with Neal Ewers, a short video demonstrating how screen readers assist the blind to navigate the web

<http://wiscinfo.doit.wisc.edu/ltde/access/ewers.htm>

- /// Video in QuickTime Format

http://www.doit.wisc.edu/accessibility/video/intro_scrn_rdrs.mov

/// Section 508 (a)(2)(A)(ii) required the Board to develop the technical and **functional performance criteria** necessary for implementation not design requirements

- ☞ Performance criteria felt to give discretion in achieving the required end result
- ☞ Design requirements felt to inhibit development and innovation

- /// Ensures that the individual accessible components work together to create an accessible product
 - /// Requires a product's operation and information retrieval functions must be operable through the six modes addressed
 - /// Functional provisions also specify the type of assistive technology that must be supported
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1 - Vision



- /// At least one mode of operation and information retrieval that does not require user vision shall be provided
- /// Support for assistive technology used by people who are blind or visually impaired shall be provided
 - ☞ Screen readers, e.g., JAWS, WindowEyes

2 - Visual Acuity



- /// At least one mode of operation and information retrieval that does not require visual acuity greater than 20/70 shall be provided in audio and enlarged print output working together or independently
- /// Support for assistive technology used by people who are visually impaired shall be provided
 - ☞ Screen magnifiers, e.g. ZoomText

3 - Hearing



- /// At least one mode of operation and information retrieval that does not require user hearing shall be provided
- /// Support for assistive technology used by people who are deaf or hard of hearing shall be provided
 - ☞ Visual notification of alarms (not necessarily separate technology)

4 - Enhanced Auditory



- /// Where audio information is important for the use of a product, at least one mode of operation and information retrieval shall be provided in an enhanced auditory fashion
- /// Support for assistive hearing devices shall be provided
 - ☞ Audio output for amplifiers, etc.

5 - Speech



- /// At least one mode of operation and information retrieval that does not require user speech shall be provided
- /// Support for assistive technology used by people with speech disabilities shall be provided
 - ☞ Alternative for voice recognition, etc.

6 - Motor Control



- /// At least one mode of operation and information retrieval that does not require fine motor control or simultaneous actions and that is operable with limited reach and strength shall be provided
- /// No support clause for this disability type because of the numerous individual disabilities
 - Spinal cord injury
 - Loss or damage of limb(s)
 - Cerebral palsy
 - Muscular dystrophy
 - Multiple sclerosis
 - Spina bifida
 - ALS (Lou Gehrig's Disease)
 - Arthritis
 - Parkinson's
 - Essential Tremor

Fully Usable Product



- /// In order for a product to be fully usable by persons with disabilities, information about the product, training, and product support services must also be usable by persons with disabilities

- /// Upon request, agency must ensure end-user documentation is available in alternate formats
 - ☞ Does not require alternate formats of documentation that is not provided by the agency to other users of the technology
 - ☞ Does require agency supply end-users with information about a product's built-in accessibility or compatibility features

/// Alternate formats usable by people with disabilities include, but are not limited to

- ☞ Braille
- ☞ Large print
- ☞ Recorded audio
- ☞ Other electronic formats
 - HTML
 - ASCII text
 - Accessible PDF

/// NASA Section 508 training has links to creating accessible Acrobat documents

<http://section508.nasa.gov/internal/nasaTraining.htm>

- /// Different means may be used to provide product documentation and information to people with disabilities including
 - ☞ Voice
 - ☞ Fax
 - ☞ Relay service
 - ☞ TTY or TDD (telecommunication display device)
 - ☞ Internet
 - ☞ Web

- /// All too often help desks provide only one way to ask for help, e.g., online form (often not fully accessible) only or telephone only (no fax or TTY)

- /// All training and informational video and multimedia productions, regardless of format, shall be accessible to people with disabilities
 - ☞ Speech or other audio information necessary for the comprehension of the content, shall be open or closed captioned
 - ☞ Visual information necessary for comprehension of the content, shall be audio described

- /// Help desks and other support services serving an agency must be capable of accommodating the communications needs of persons with disabilities
 - ☞ For example, an agency help desk may need to communicate through a TTY
 - ☞ Support services must also be familiar with such features as keyboard access and other options important to people with disabilities

Cost to End-User



- /// Agencies shall ensure that any information, documentation, training, or support provided by the agency to end-users is available at no additional charge

/// Accessibility is a “Good Thing”

- ☞ Often improves software usability
- ☞ Need not be expensive, but there are exceptions

/// Accessibility is the “Right Thing”

/// Compliance with Section 508

- ☞ Is not “Accessibility”, but
- ☞ Is the Law (for Federal Agencies)